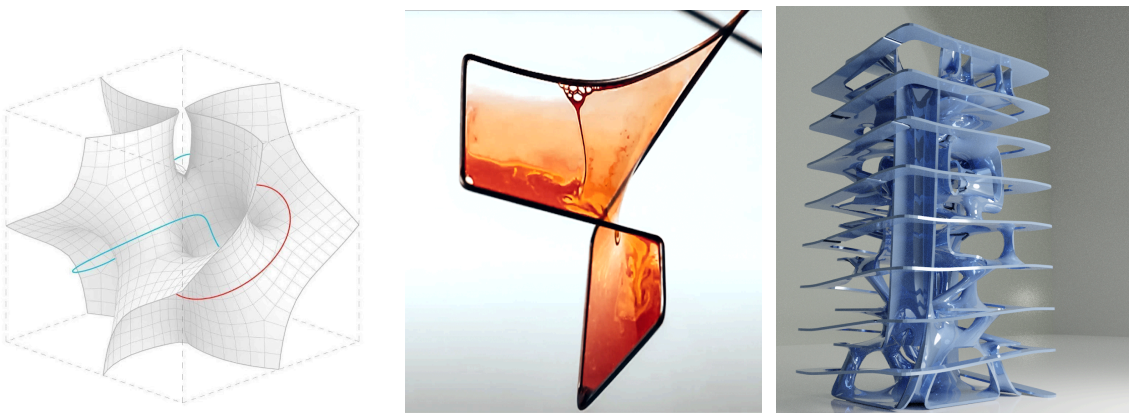
Taubman College of Architecture and Urban Planning | University of Michigan | Winter 2026 |
ARCH 709 | Friday 1.00- 4.00 PM| Room ARR | Dr. Mania Aghaei Meibodi | meibodi@umich.edu |
https://dartlab.umich.edu/ | https://www.instagram.com/dart.umich/



The left image shows a new method of generating minimal surfaces using a graph skeleton developed at Digital Architecture Research and Technologies (DART) at the University of Michigan and Fabtory. The middle and right images, respectively, illustrate the physical computation of minimal surfaces and their application in architecture. Middle and right: student work from a prior course taught by Dr. Mania Aghaei Meibodi—middle by Matthew Weyhmiller; right by Jake Brown, Douglas Tsui, and Yanlin Zhou.

ARCH 709 - Advanced Computational Geometry

Computational geometry is foundational to the future of manufacturing. Today's advanced manufacturing (AM)—encompassing additive, robotic, and hybrid digital fabrication—enables building elements to be produced as performance-tuned, data-rich systems rather than fixed, one-size-fits-all parts. For the first time, geometric complexity is no longer a liability of fabrication, but an opportunity to unlock the full potential of robotic construction and 3D printing. This course introduces students to computational geometries, representations, and programming methods necessary for designing and implementing them.

This course is structured around the following main activities: lectures and hands-on programming work led by the instructor, as well as academic and industrial experts; selected readings; computational design workshops; weekly assignments; a midterm project; and a final project. Students will submit their works in various formats, including physical models. PhD students taking this course will also develop a manuscript for publication. A basic understanding of Rhino, Grasshopper, and Python programming is required. Students should bring a laptop with Windows, Rhino 7.0, Grasshopper, and the required software. Midterm and final assignments will involve 3D printing.